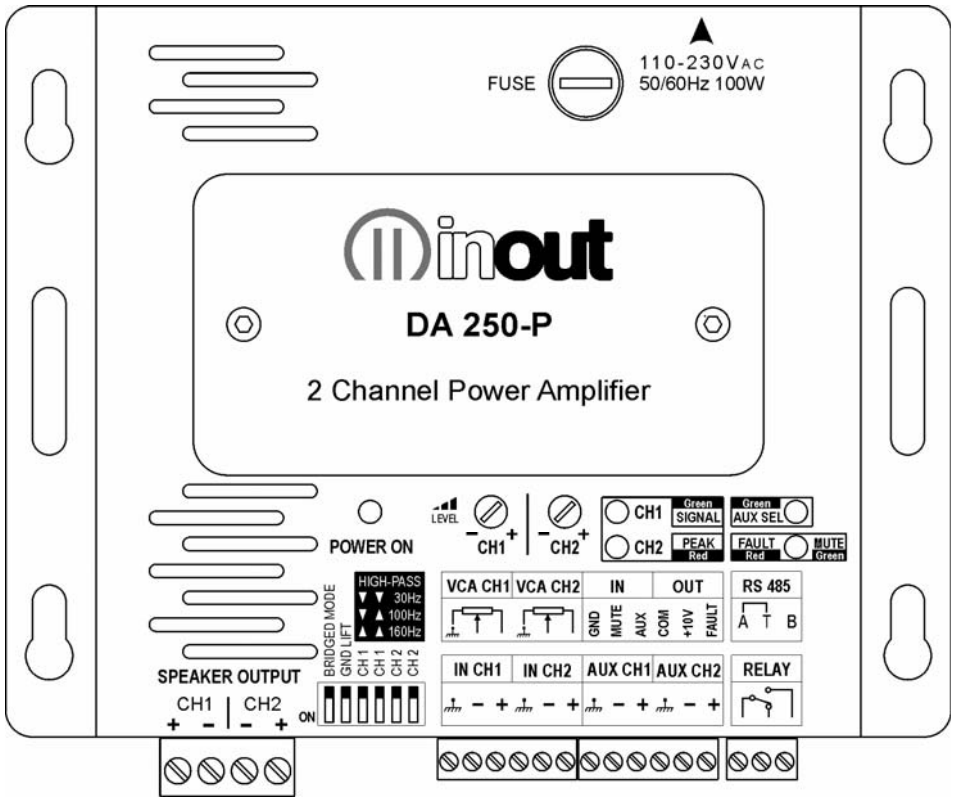
USER MANUAL



Version 1.0

DA 250-P

inout

Warranty

DA 250-P is covered by 24 month warranty on its electronics parts, starting from the date of purchase. This warranty becomes void in case of tampering with the device and in case of work carried out on it by people that were not authorized by the manufacturer or by an authorized dealer. Warranty conditions are those described in the “Warranty Rules”.

NOTE - responsibility of the purchaser: in case of repair under warranty, the device must be packed in order to avoid damage during transport and shipped to the manufacturer together with all the accessories.

Warranty Rules.

1. In order to exercise his warranty rights, the purchaser must include with the device a copy of the evidence of purchase duly stamped by the dealer (bill/invoice).

2. The warranty lasts 24 months on the electronic parts. The warranty is granted at the point of sale or it could be directly requested to the manufacturer.

3. The warranty only covers damage to the product which makes it work badly.

4. Work under warranty will only mean repairing or replacing, free of charge, any parts acknowledged being defective during manufacture or in their material, including labour costs.

5. The warranty does not apply to damage caused by negligence or failure to comply with the instructions, or damage caused by unauthorised people, with a special reference to the external parts.

6. Also, the warranty does not apply to damage caused to the device by connection to unsuitable power sources.

7. The warranty does not cover parts that are subject to wear as a consequence of the use, as well as the chassis if the material is not defective.

8. The warranty does not include transport costs, which will be paid by the purchaser depending on way and time of transport.

9. The warranty expires 24 months after the purchase. In this case, service will be provided charging for the replaced parts, labour costs and transport according to the current rates.

10. In case of any controversy the Court of Law of Venice has the exclusive jurisdiction.

SUMMARY

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1.2 Contents of the DA 250-P
1.3 Safety rules

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1 Installation

1.1 Introduction

The power amplifier DA 250-P has been developed to satisfy most of the professional audio installations and designed to provide performance with the best stability and reliability, permitting a continued use without failure and without the need of maintenance.
The power stages circuitation is based on the new generation “Class D” technology that permit to obtain high quality performance, low heat dissipation and that permit to keep distortion within a very small range also with a high power supplied.
Power supply circuit is “switch mode” with the benefit of high efficiency and reduced weight.

1.2 Contents of the DA 250-P

Contents of the DA 250-P kit:

- n° 1 DA 250-P device
- n° 1 user manual
- n° 1 power supply cable

1.3 Safety rules

Read carefully the following warnings to keep your and others safety, for the right use of the device and to avoid warranty invalidation.

1. Do not expose the device to rain or high humidity. Protect the device from accidental liquid penetration, if it happens, stop using the device and apply to qualified or authorized personnel.
2. Do not insert things into the device through the openings to avoid risk of fire or electric shock.
3. Before connect the amplifier, ALWAIS verify the ground connection as requested by the law.
4. Disconnect the device from the light socket before make any operation for the internal device configuration.
5. This power amplifier has been designed and produced to operate with a 110-230VAC 50/60Hz. universal mains power.
6. If the original power cord is waste or deteriorate, replace it with a similar one.
7. For speakers connections the use of cables with appropriate section and that meet the safety laws is suggested.
8. Switch on the amplifier only after all the other components of the sound system have been connected and switched on, to avoid hums and annoying noise from the speakers.

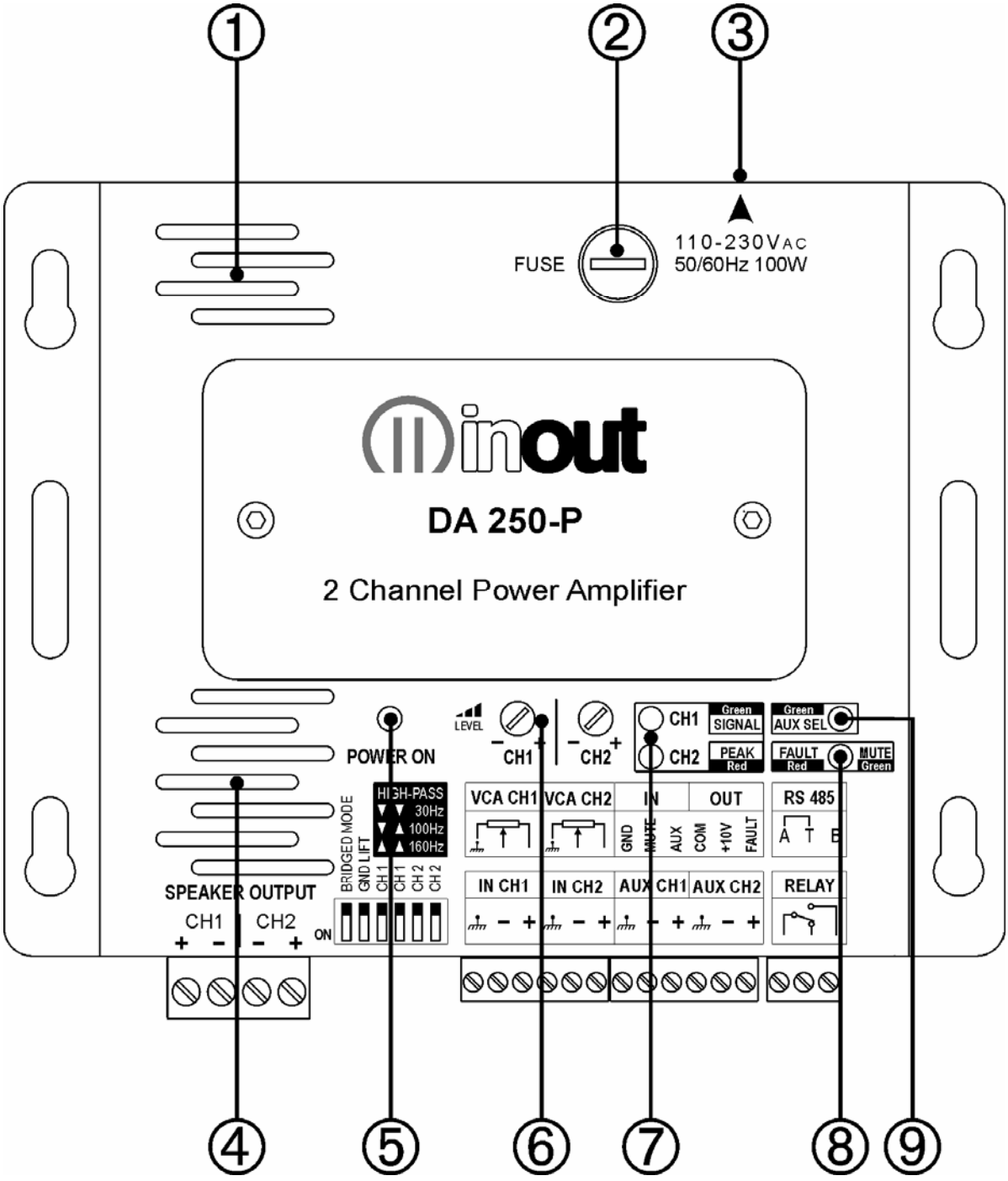
9. Disconnect the device from the light socket before make cleaning operations. Clean the device with a dry and soft cloth. Do not use liquids or spray that can contain flammable elements.
10. Device handling must take place only when all the cables have been disconnected.
11. Device maintenance must be done only by qualified personnel.
12. For any requirement or technical information contact InOut or authorized personnel.

OBSOLETE DEVICES DISPOSAL

- This picture means that the device is European Directive 2002/96/EC compliant.
- All electronic and electric devices should be disposed separately from the normal garbage, by specific gathering plants designated by the government or by local authorities.
- Correct disposal of obsolete devices, of the accessories and especially of the batteries, contribute to prevent possible negative consequences on human health and on the environment.
- For detailed information on obsolete devices disposal, contact the municipality, the garbage disposal service or the store where you bought the device.

2 Overview

2.1 General overview



1) Power section cooling grille.

2) Protection fuse on mains power

3) 110-230VAC mains power connector, use the appropriate supplied cable.

4) Power amps cooling grille.

IMPORTANT:
The power amplifier, during regular operation, needs a suitable cooling that can be done by natural or forced ventilation.
In case of more amplifiers mounted on a single rack, air exchange could be poor; it's advisable, in this case, to provide forced ventilation to the rack too. It's advisable that the ventilation take place with the air aspiration from the bottom and the air emission from the top of the rack.

5) Device ON LED, powered device.

6) CH1 – CH2 input sensibility adjustment potentiometers

7) Two-colour LED with indication purpose:

LED		*Description*	*Indicating*
off	=	input signal not present or too low	
green	=	input signal present	SIGNAL
red	=	input signal too high	PEAK

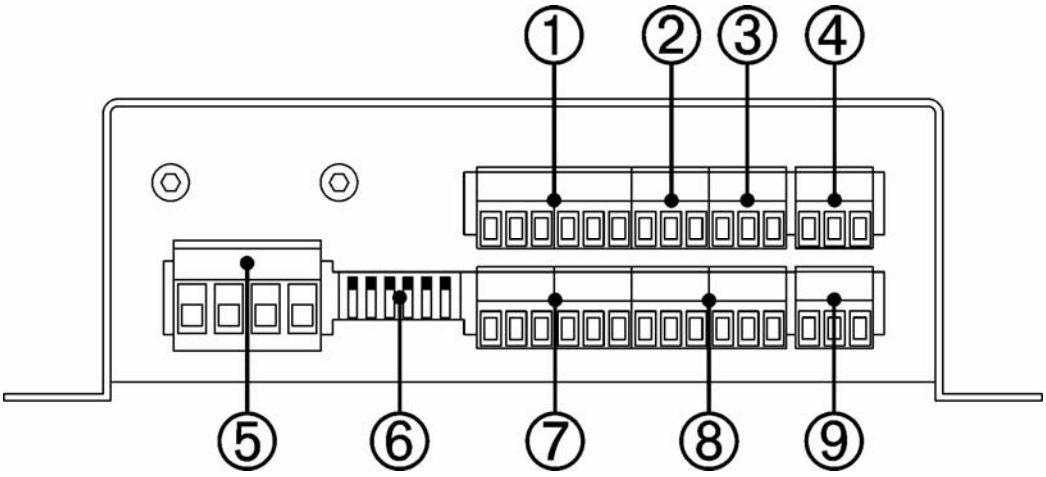
8) Two-colour LED with indication purpose:

LED		*Description*	*Indicating*
off	=	Smooth operation	
Green (blink)	=	Output channels Muting	MUTE
red	=	output channel fault	FAULT

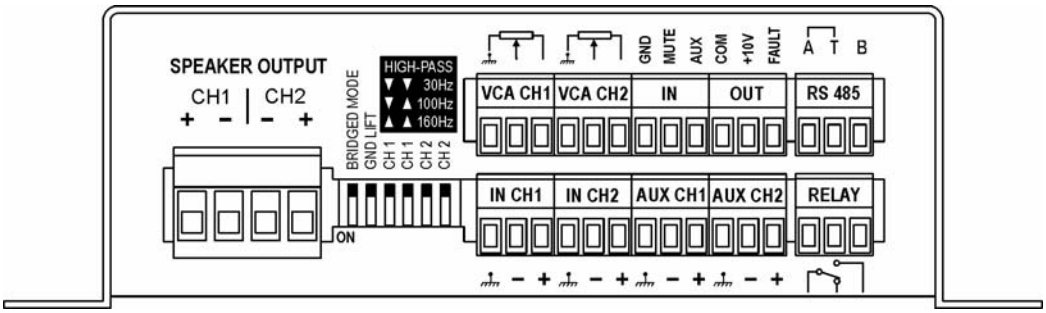
9) LED with indication purpose:

LED		*Description*	*Indicating*
off	=	Audio inputs IN CH1 / IN CH2 enable	
green	=	Audio inputs AUX CH1 / AUX CH2 enable	AUX SEL

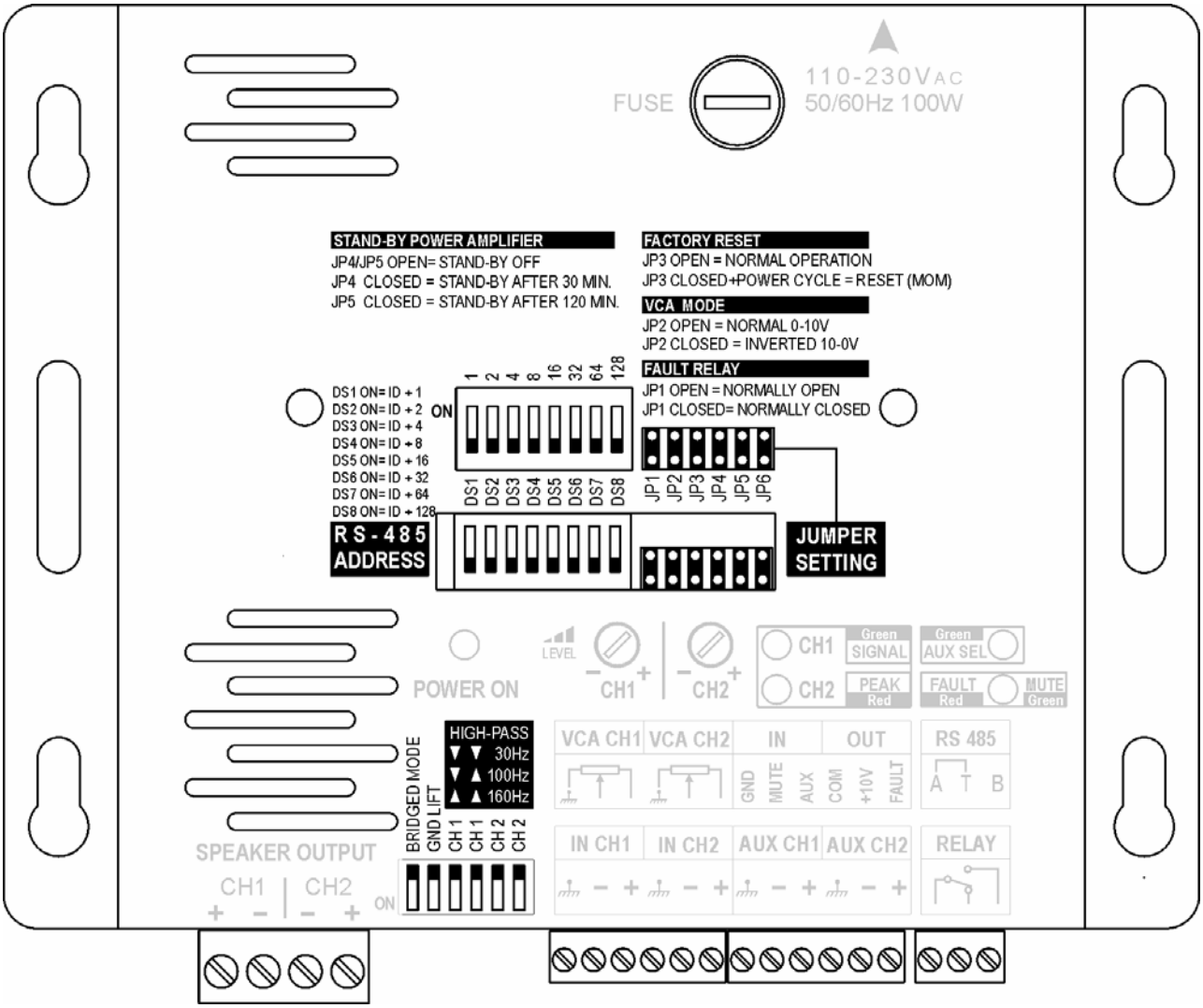
2.2 Description links



1) External volume adjustment potentiometers connector (VCA)
2) Connector input selector IN/AUX e MUTING enabling.
3) Fault output TTL connector
4) RS485 serial connector
5) CH1/CH2 power output (speakers) connector.
6) DIP-SWITCH operation amplifier setting
7) IN CH1/CH2 balanced input connectors
8) AUX CH1/CH2 balanced input connectors
9) Fault output relay connector



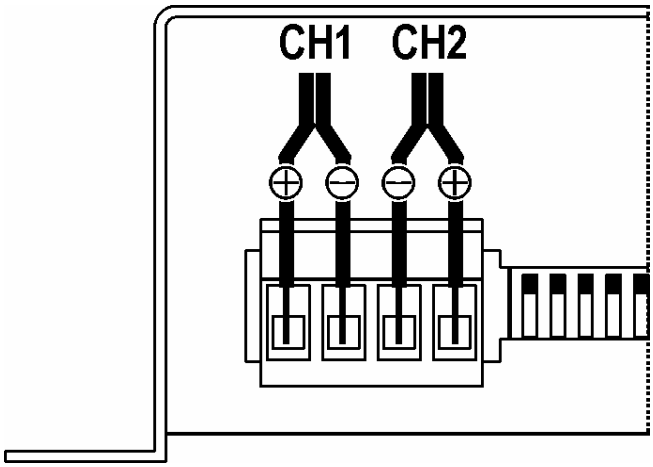
2.3 Power amp configurations general overview



3 Connections

3.1 2 channels configuration

2 CHANNELS AMPLIFICATION OUTPUT CONNECTIONS

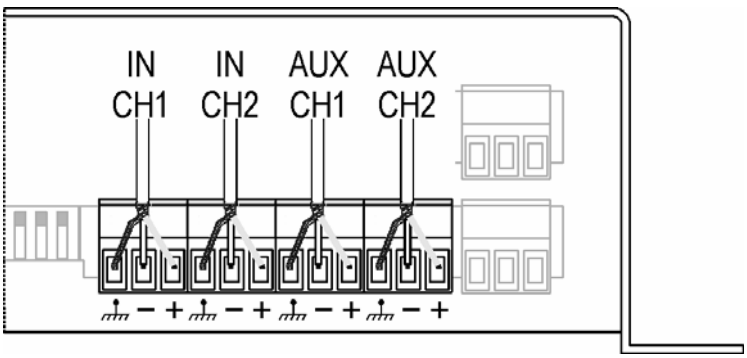


Observe correct polarity in speaker connection to have output signals in phase with the input ones.

IMPORTANT:

- Do not connect outputs among them or to others amplifiers outputs.
- Do not short circuit the outputs.
- To connect the speakers use the appropriate cable section depending on the connection length. Reduced section cables cause power loss along the line with, consequently, cable heating.

2 CHANNELS AMPLIFICATION INPUT CONNECTIONS



BALANCED INPUT:
Pin 1: ground
Pin 2: reverse phase signal
Pin 3: in phase signal

UNBALANCED INPUT:
Pin 1: ground
Pin 2: ground
Pin 3: in phase signal

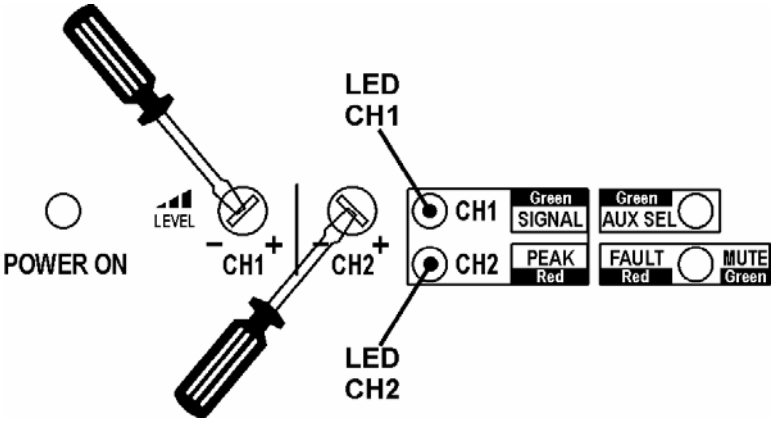
IMPORTANT:

- 20Kohm nominal impedance inputs.
- For unbalanced signals is mandatory to connect together pin 1 and 2.

Input connections advices

- Use only hi-quality coaxial cables.
- Unbalanced connections must be as shortest as possible
- Do not put low level signal cables close to high level ones (speakers cables) or close to power cables. This avoid induction noise introduction.
- DO NOT CONNECT together input and output grounds to avoid ground loops.
- Switch off the amplifier before make changes on connections.
- Keep in mind that the system can give instant high power.

2 CHANNEL AMPLIFICATION INPUT LEVEL ADJUSTMENT

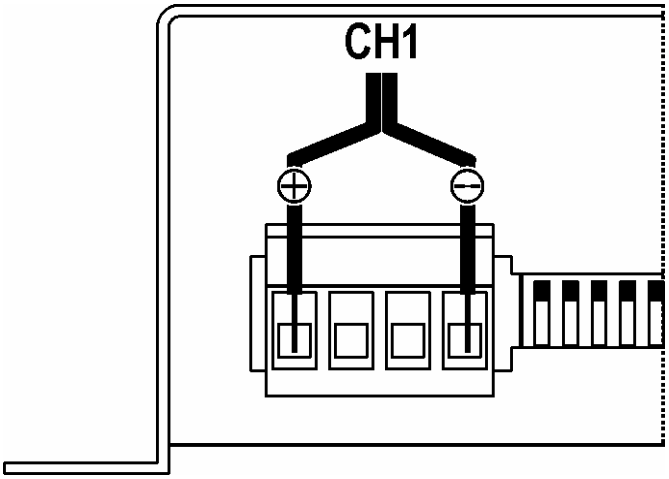


Level controls on rear panel are independent for each channel in the section.

IMPORTANT:
Adjust input sensibility until green LED lights on.
If the LED becomes red, input signal is saturated; this generates audio distortion to the output.

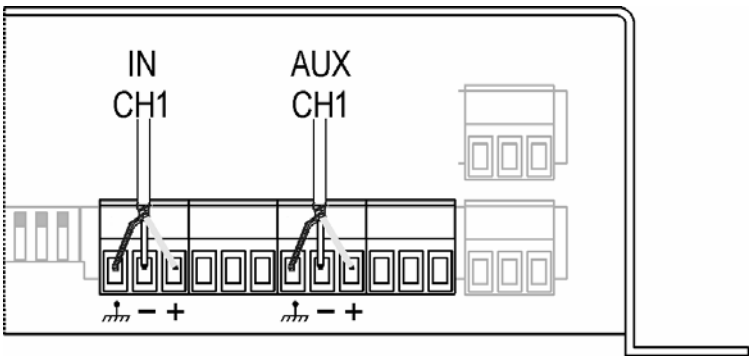
3.2 1 channel amplification – BRIDGED MODE

BRIDGED MODE AMPLIFICATION OUTPUT CONNECTION



In BRIDGED mode, the outputs are ground lifted, also with no signal; do not connect the negative pole to the amplifier chassis.

BRIDGED MODE AMPLIFICATION INPUT CONNECTION



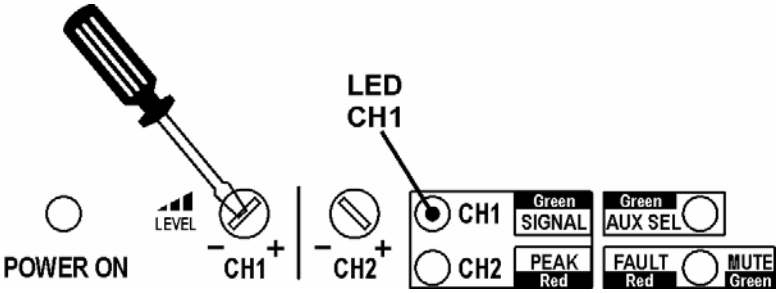
BALANCED INPUT:
Pin 1: ground
Pin 2: reversed phase signal
Pin 3: in phase signal

UNBALANCED INPUT:
Pin 1: ground
Pin 2: ground
Pin 3: in phase signal

IMPORTANT:

- 20Kohm nominal impedance inputs.
- For unbalanced signals is mandatory to connect together pin 1 and 2.

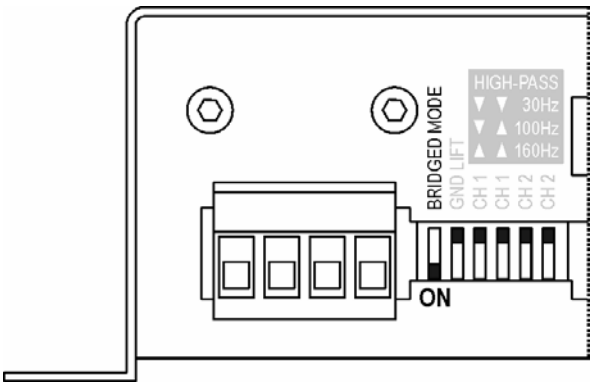
BRIDGED MODE AMPLIFICATION INPUT LEVELS ADJUSTMENT



Volume adjustment for the section is made by the correspondent input channel potentiometer.

IMPORTANT:
Adjust input sensibility until green LED lights on.
If the LED becomes red, input signal is saturated; this generates audio distortion to the output.

STANDARD - BRIDGED MODE SETTING



The **DA250-P** is provided with two separated and independent channels CH1 and CH2, or it can operate as "BRIDGED" mode that is with “bridged” channel link.
The operating mode setting is done by the Switch beside the output speaker connector.

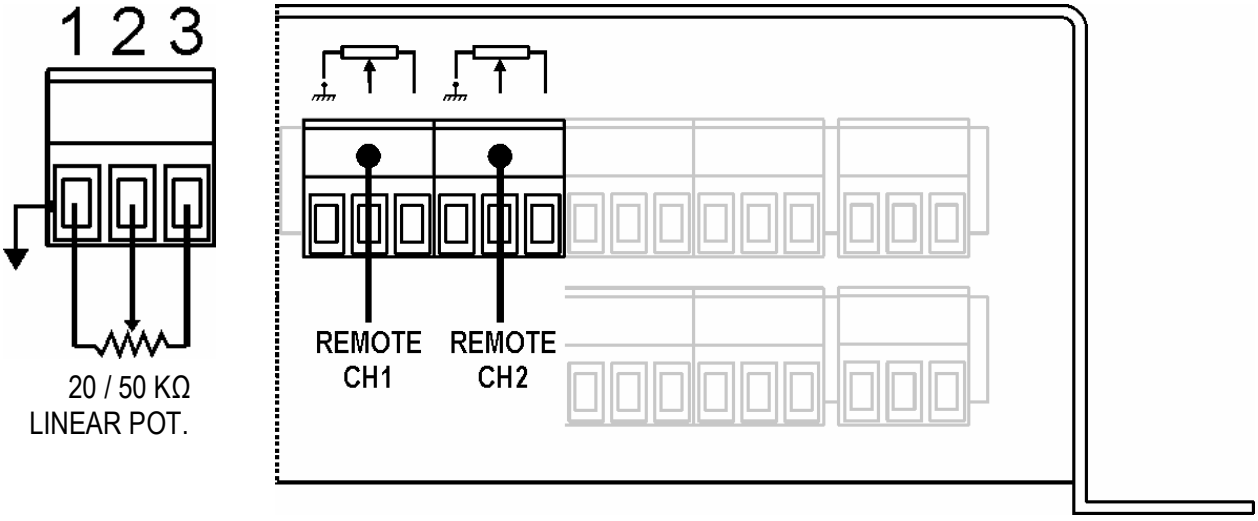
IMPORTANT:

- **In such configuration 8 ohms is the minimum impedance**
- **It’s advisable to disconnect mains cable during mode setting operations to avoid damage to the amplifier.**

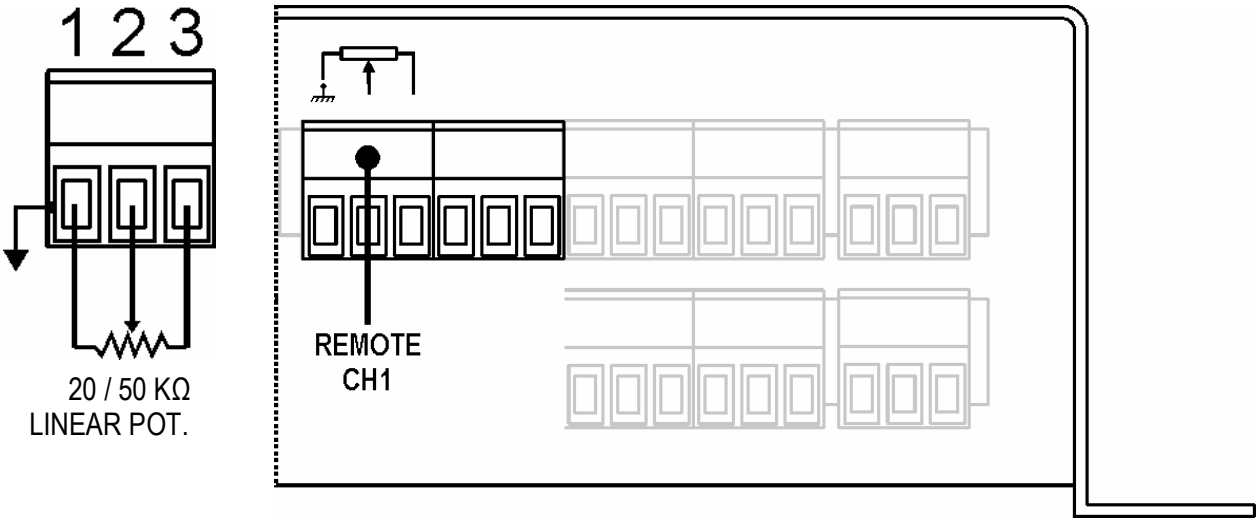
3.3 Volume remote control - VCA

There is one connector for each single channel, where connect a potentiometer to allow volume remote control.

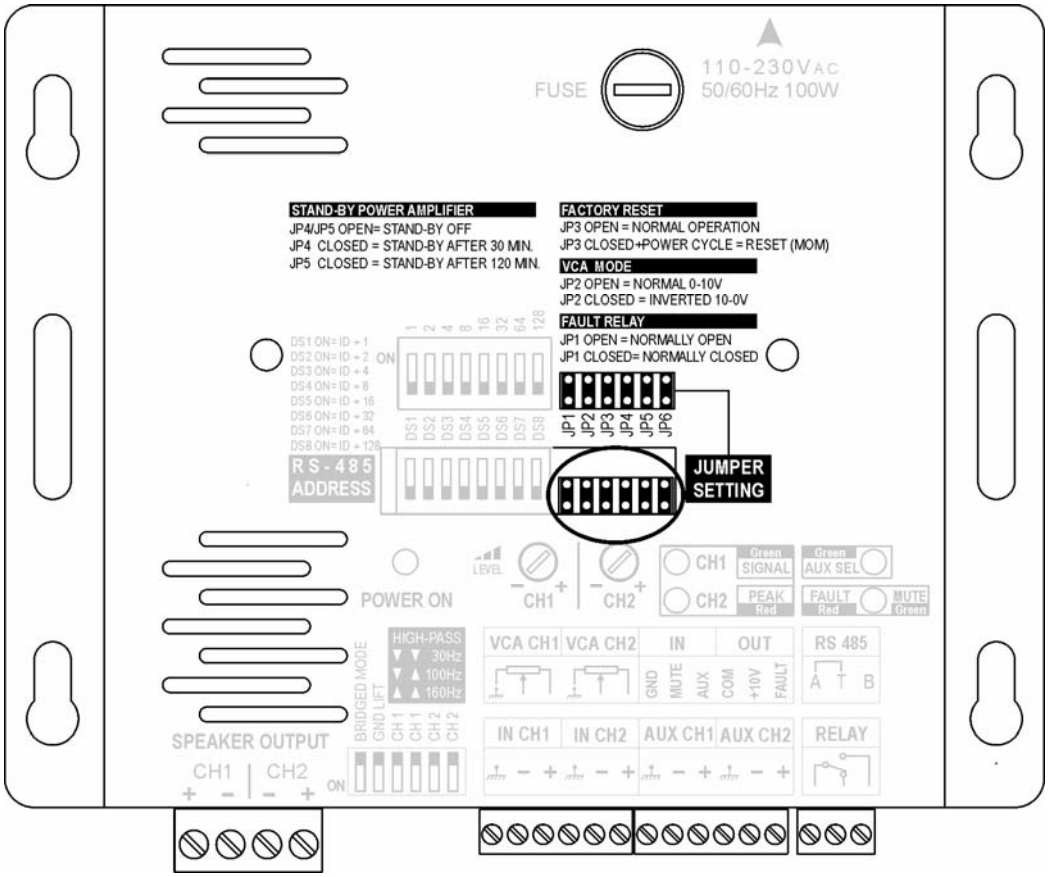
VOLUME REMOTE CONTROL CH1-CH2 AMPLIFICATION

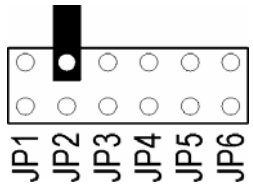
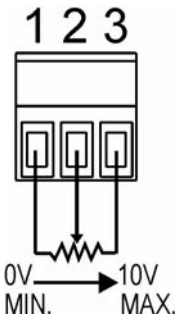
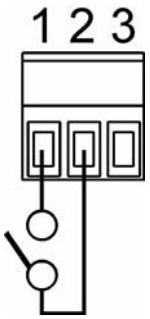
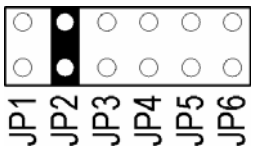
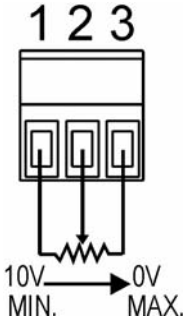
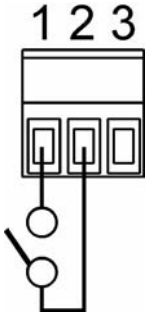


VOLUME REMOTE CONTROL IN BRIDGED MODE AMPLIFICATION



REMOTE CONTROL INTERNAL CONFIGURATION



JUMPER	VCA		MUTE
		***NORMAL 0-10V***	
		***REVERSE 10-0V*** *(DEFAULT)*	

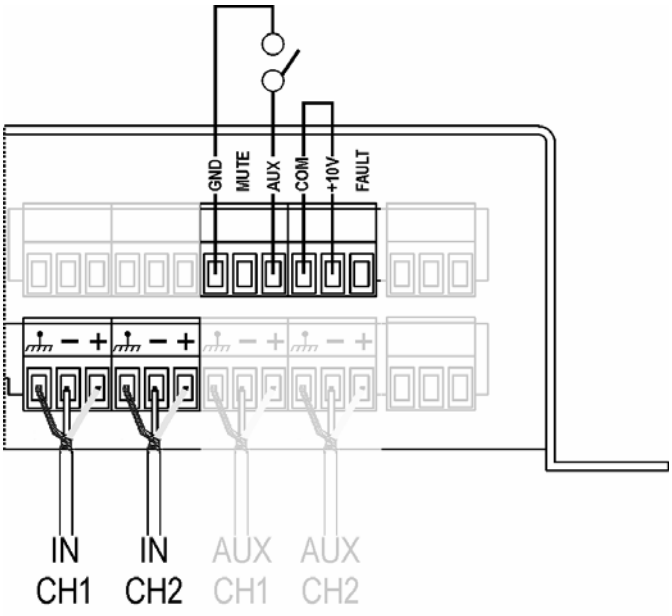
3.4 Inputs selection AUX

Besides the standard audio inputs IN CH1 and CH2, the DA250-P provides other audio auxiliary inputs AUX CH1 and CH2, to select those inputs you must use one logical control on the shown connector.

IMPORTANT:

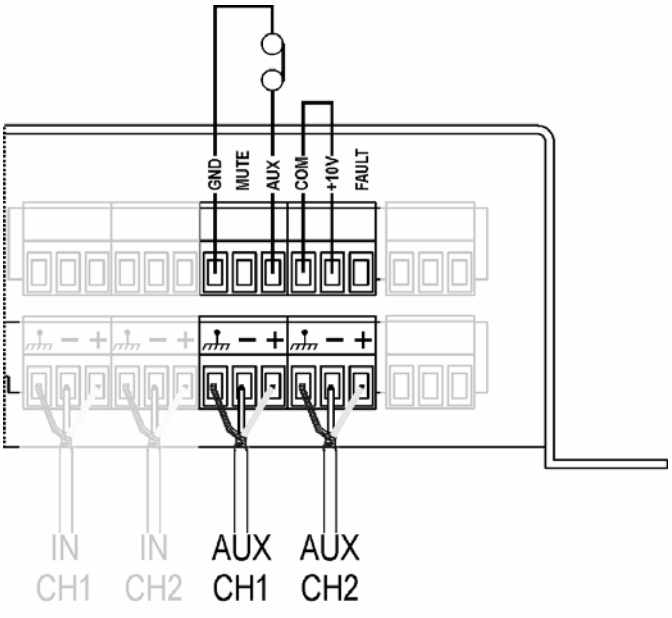
- The AUX inputs do not have any sensitivity adjustment and do not have any high pass filter as well.

AUDIO INPUTS SELECTION CH1 AND CH2



In normal operation the IN CH1 and IN CH2 inputs are enabled

AUDIO INPUTS SELECTION AUX CH1 AND AUX CH2

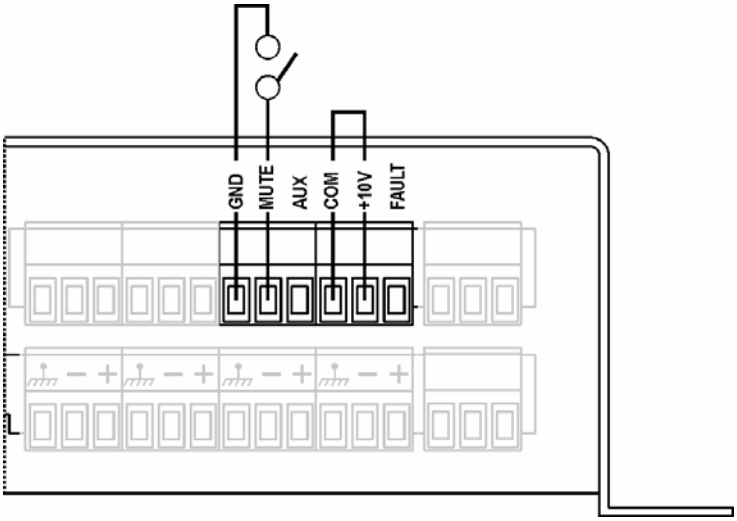


The amplifier provides for optical insulated inputs, to enable one input you must connect the +10V voltage to the COM pin (common inputs).
To enable the input AUX it is necessary to link it to the ground (GND).
The input selection appears with the lighting of the green LED AUX SEL upon the amplifier.

3.5 MUTE Control

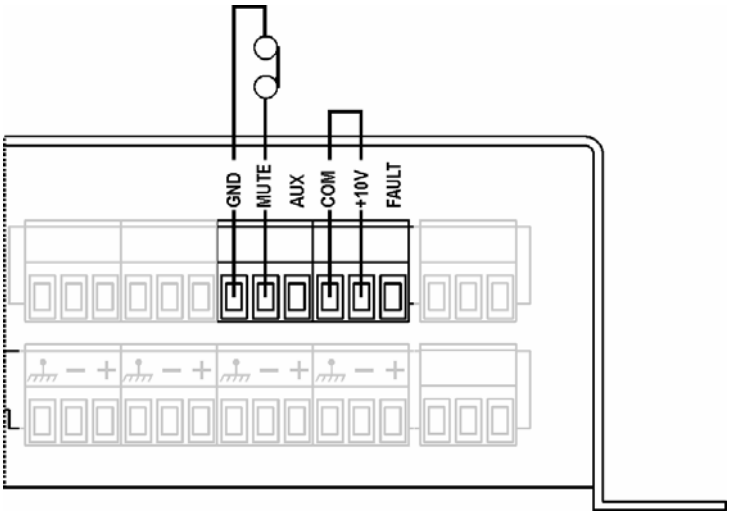
The DA250-P has one logical input to disable the final stages of the power amplifier (MUTE), to enable the Muting act as previously shown.

NORMAL OPERATING



Normal operating, active amplifier.

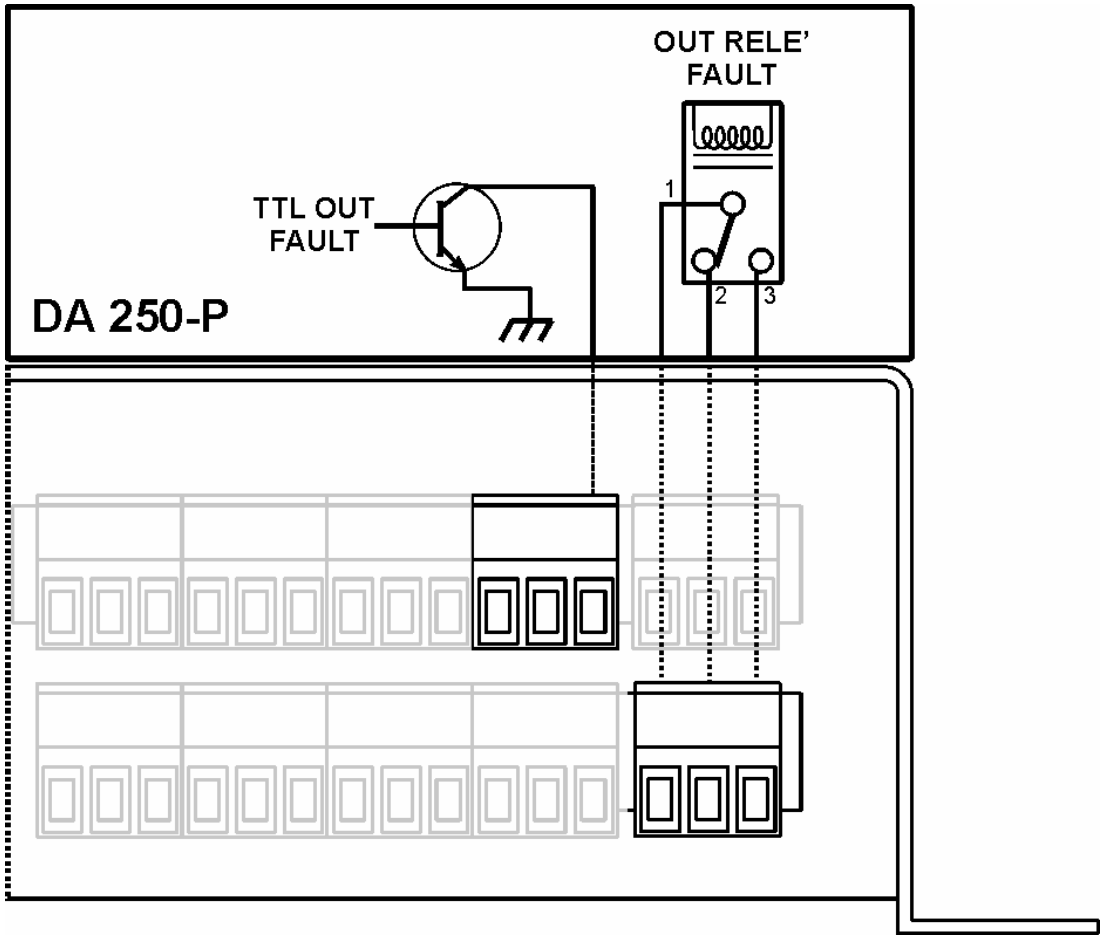
ACTIVATION MUTE INPUT– POWER AMPLIFIER NOT OPERATING



The amplifier provides for optical insulated inputs, to enable one input you must connect the +10V voltage to the COM pin (common inputs).
To enable the input MUTE it is necessary to link it to the ground(GND).
The muting activation appears with the lighting of the green LED MUTE upon the amplifier.

4 Amplifier configurations

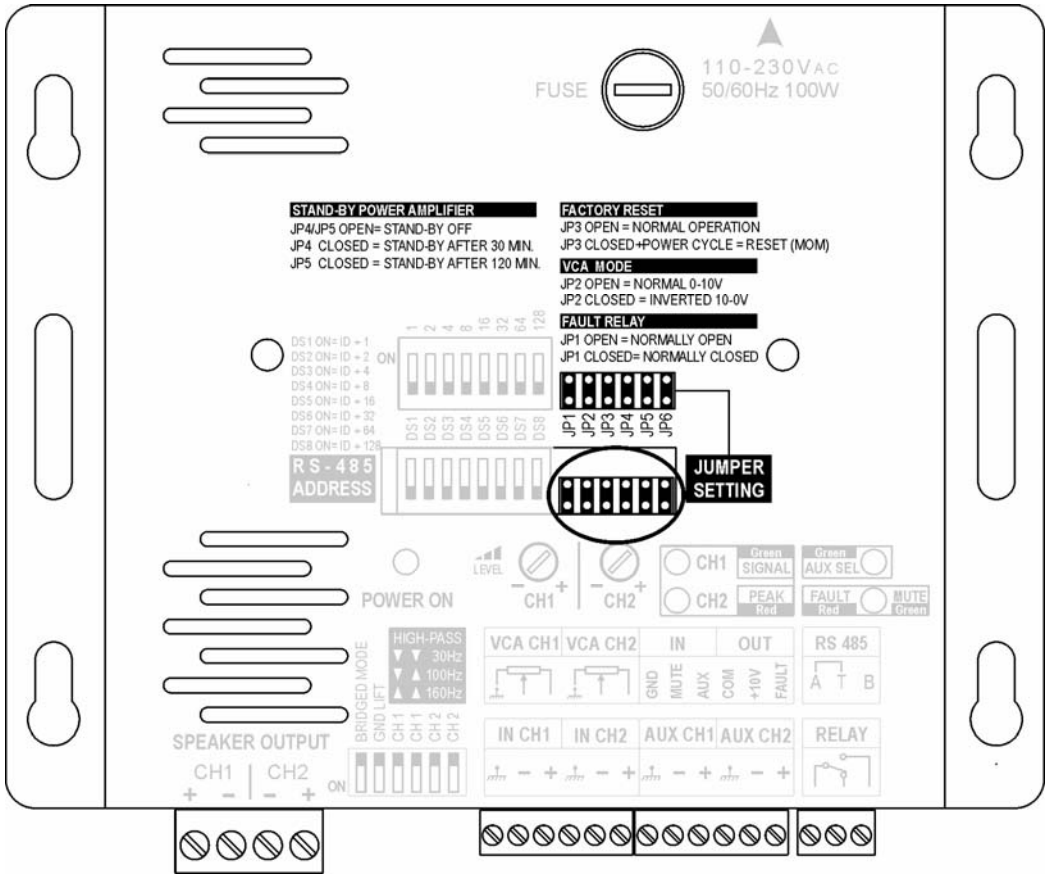
4.1 Fault signal - FAULT

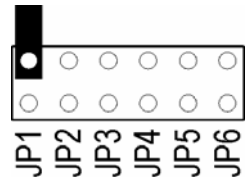
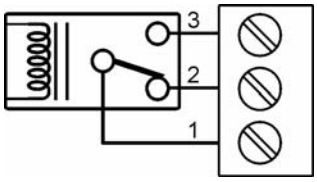
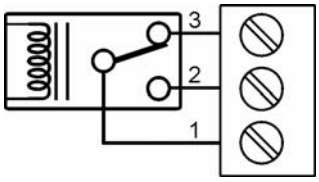
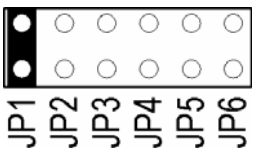
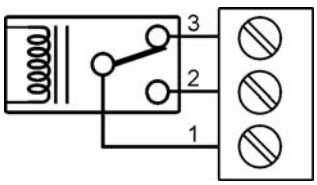
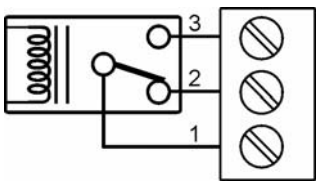


The DA250-P is provided with connector outputs for faults signalling of the amplified channels, both with relay contact and double TTL output.
If the amplifier is part of a safety or alarm system, the DA 250-P allows setting the relay contacts with reverse logic where contact is normally closed during regular operations and will be open in case of fault.
To enable this operating mode remove the TOP cover and set the jumpers as hereinafter.

IMPORTANT:
This function could be enabled only for the fault signal relay, not for TTL outputs.

FAULT SIGNAL RELAY OUTPUT INTERNAL SETTING



JUMPER	*NORMAL*	*FAULT*
		
		

4.2 RS485 Serial communication

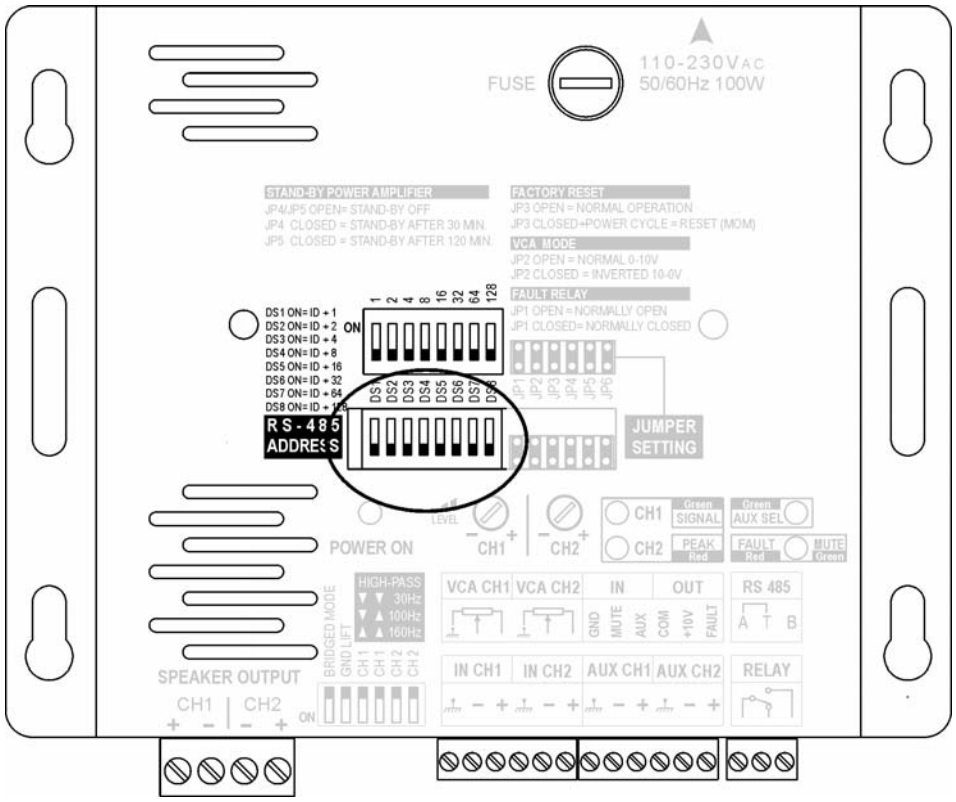
DA 250-P could be connected via serial port to an RS485 communication bus, to be controlled by a master system or a computer.
Because of disturbs on the serial line coming from outside, dysfunctions can occur to the master system with possible harms to the amplifier; to avoid such troubles use the following precautions:

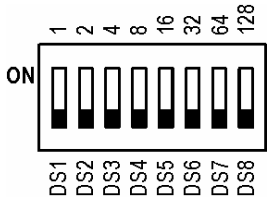
- Do not put serial cables in the same pipe with power cables or hi-voltage cables. Keep a safe distance from those cables, at least 10 cm.
- Connect the cable screen to the ground at one end (not both ends); ground connection should not be made in the same point where hi-voltage circuits are connected to the ground.
- Switch off the whole system before start wiring the serial lines: also missing or parasite currents could damage the modules.

DA 250-P support multipoint serial communication with the RS-485 electric standard, that allows to connect up to 32 amplifiers, each one with its own address.
The address is a number that enables the master system to establish the communication with a specific DA-480 among the several ones connected to the same communication bus.

IMPORTANT: during address setting pay attention to not define more than one module with the same number, otherwise communication becomes confuse and irregular and exchanged data will doesn't make sense.

ADDRESS SETTING ON RS485 BUS

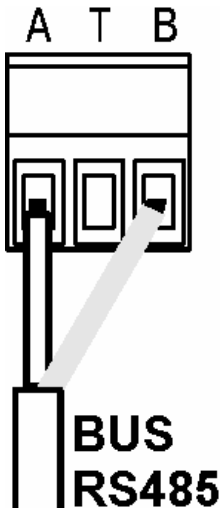


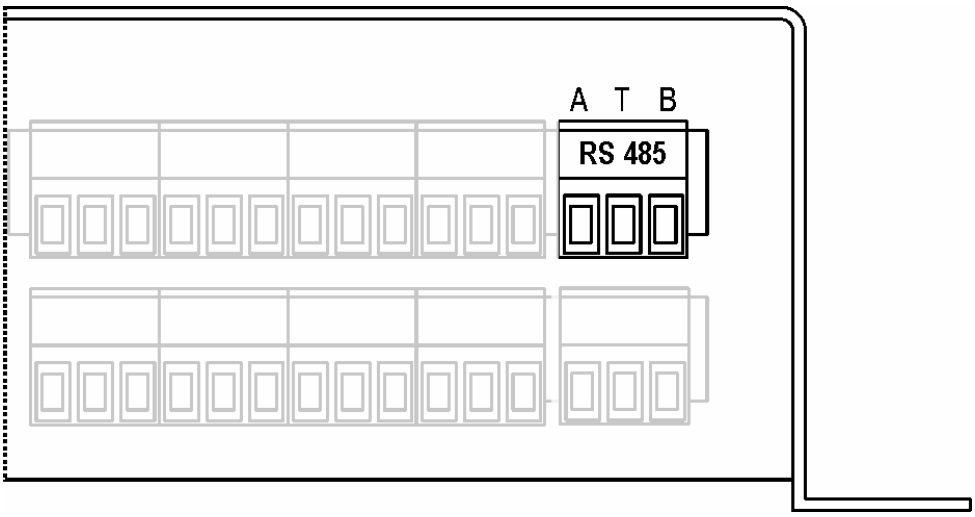


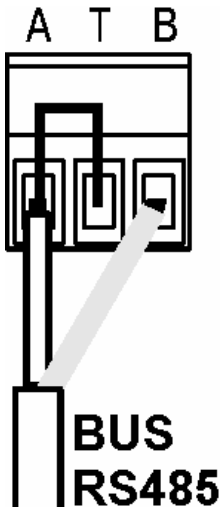
DS1 ON= ID + 1
DS2 ON= ID + 2
DS3 ON= ID + 4
DS4 ON= ID + 8
DS5 ON= ID + 16
DS6 ON= ID + 32
DS7 ON= ID + 64
DS8 ON= ID + 128

RS-485 ADDRESS

RS485 BUS CONNECTION







TERMINATION RESISTANCE ON SERIAL LINE

When connected to an RS485 bus should be provided termination resistance at both ends of the line, to avoid stationary waves creation ant to define line impedance also with no transmission.

DA 250-P has the termination resistance inside, but it is disconnected. To plug it in just short circuit A and T clamps as shown in the picture.

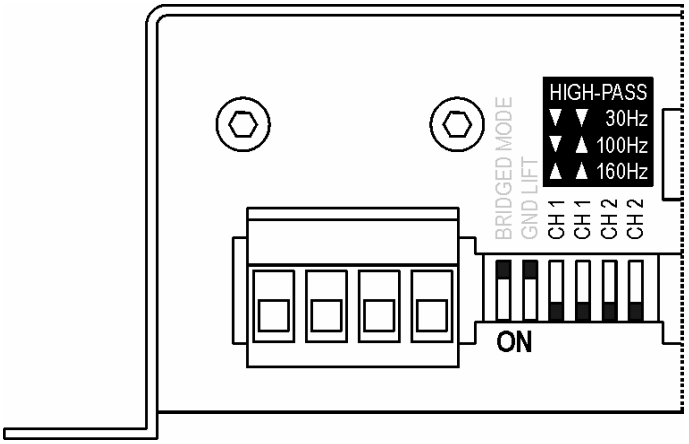
4.3 Hi-pass filter

The amplifier has one independent hi-pass filter per channel placed between the input signal and the power amplification stages which allows to directly drive the limited band speakers.

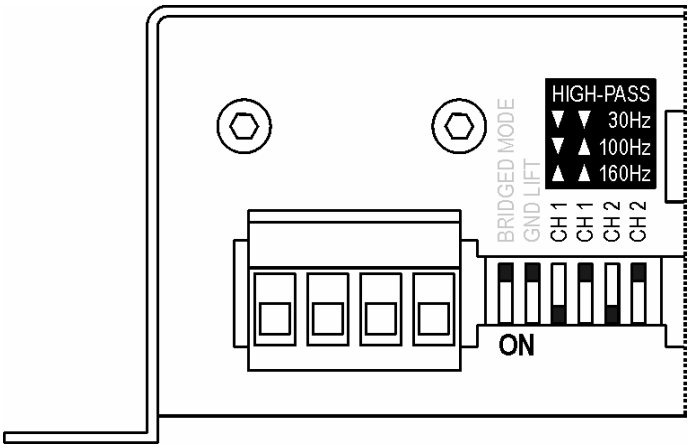
IMPORTANT:

To enable the filter, use both the Switches for each channel.

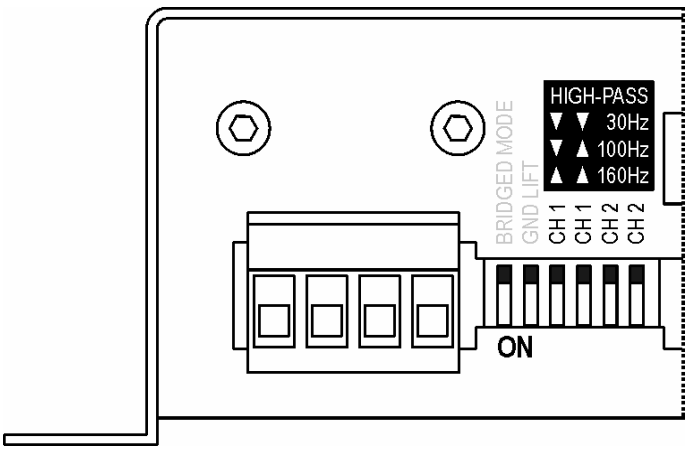
HI-PASS FILTER SETTING



High-pass filter set to 30 Hz.



High-pass filter set to 100 Hz.

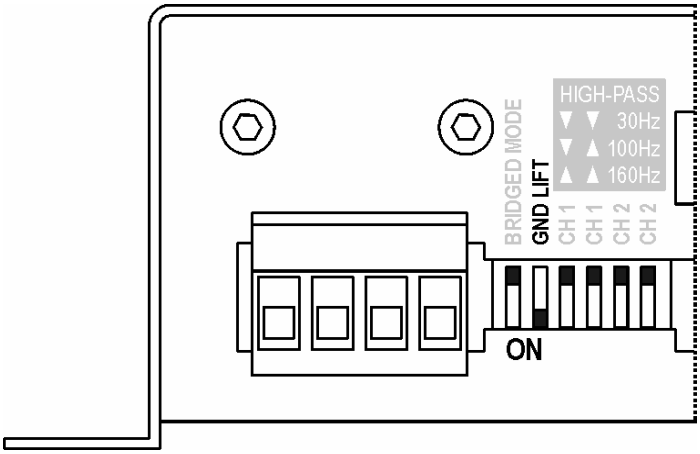


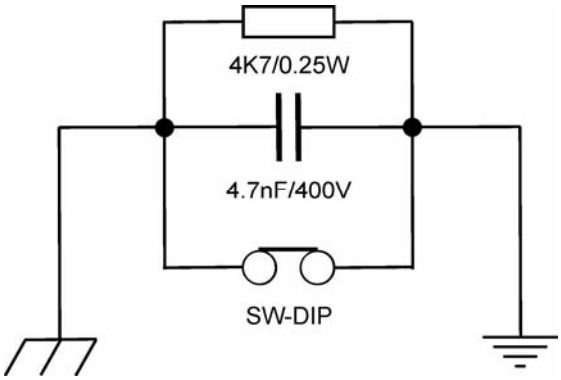
High-pass filter set to 160 Hz.

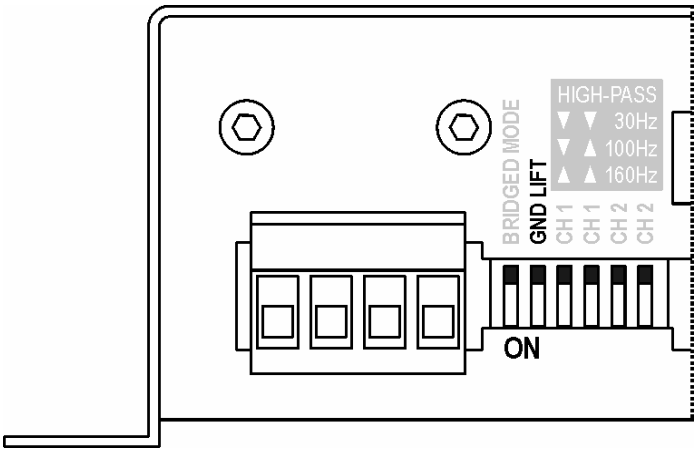
4.4 GROUND-LIFT

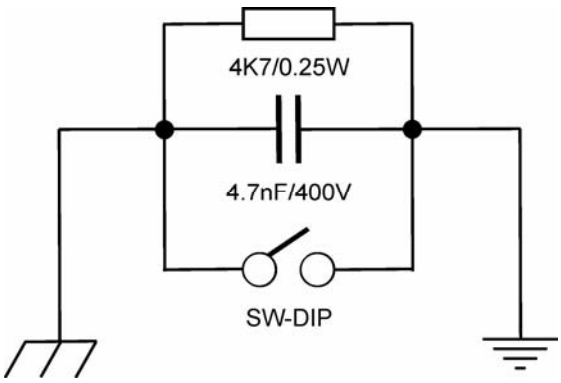
If there is low frequencies noise on the speakers due to ground loops, it's advisable to set DIP SWITCH to OFF position; that means to split audio ground from chassis ground.

GROUND LIFT CONFIGURATION





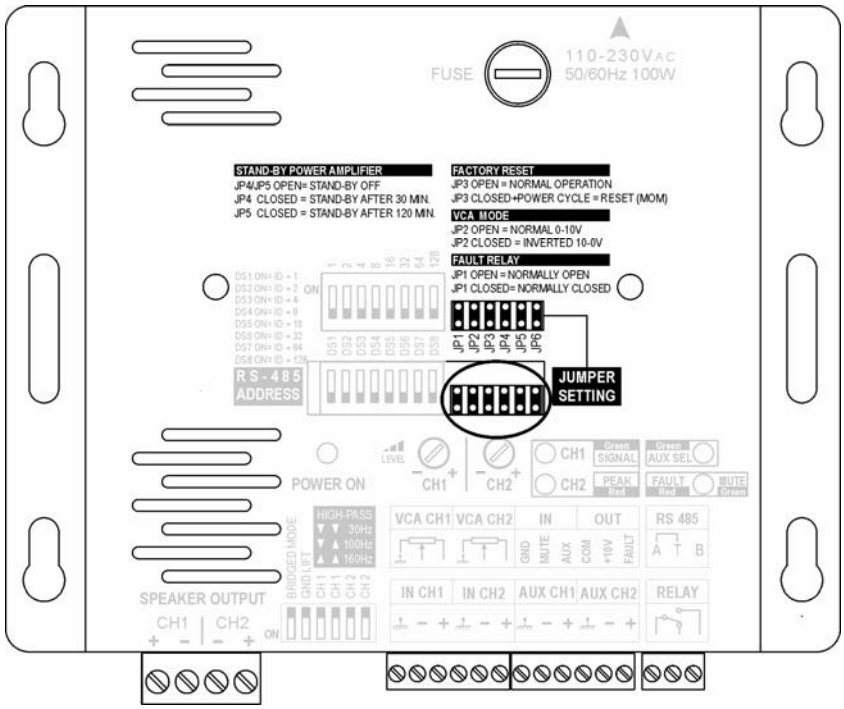


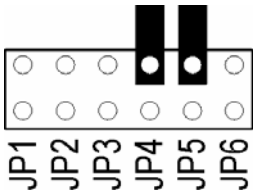
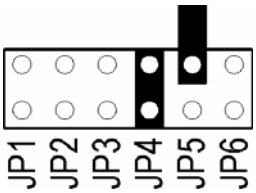
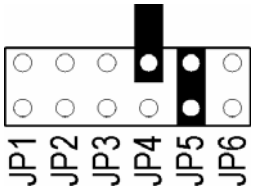


4.5 ACTIVATE STAND-BY

To optimize the light duty power consumption of the amplifier, the DA250-P is provided with automatic Stand-By mode after an adjustable time, in case of inactivity or lack of input signal. To enable this function remove the TOP cover and set the jumpers as follow.

ACTIVATE STAND-BY MODE



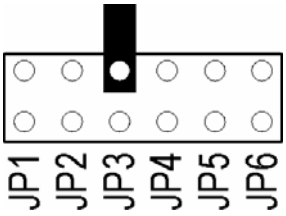
JUMPER	TIME	DESCRIPTION
	-	Power amplifier always on.
	30 minute	Automatic activation of STAND-BY after 30 minute of inactivity of the amplifier.
	120 minute	Automatic activation of STAND-BY after 120 minute of inactivity of the amplifier.

4.6 FACTORY RESET

The amplifier allows to reset all the parameters stored into the internal microchip to the original factory configuration; to enable this function remove the TOP cover and set JP3 jumper carrying out the procedure as following:

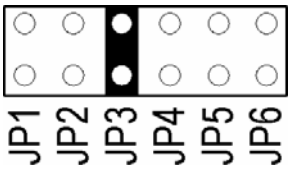
FACTORY RESET

1



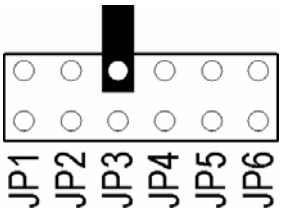
(DEFAULT)

2

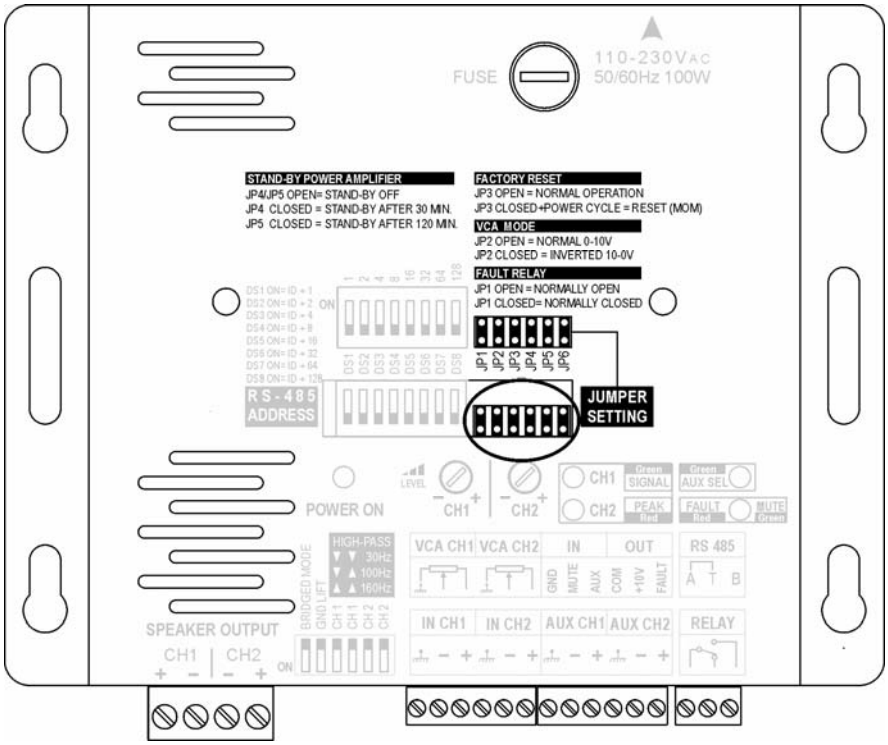


3 **POWER CYCLE**
Switch on the amplifier for 5 seconds with JP3 closed, than switch it off.

4



Put JP3 back (open) as in origin.



5 Protections

5.1 Speakers protection

The DA250-P has output protection which disconnects the speakers in case of amplifier fault. At the power on the device analyzes the voltages supplies, verifies the optimal working of the final stages of amplification and later that the speaker connections are activated.

5.2 Thermal protection

When the amplifier internal temperature reaches high levels, the cooling fan will be activated with variable speed depending on the temperature.
In case the amplifiers reach the maximum allowed temperature, the thermal protection will be activated and the involved channels will be deactivated, switching them back on when an acceptable running temperature is reached. This condition is indicated with a FAULT LED.

5.3 Over-current and short-circuit protection

The device has inside an “high-currents” or “output short-circuit present” protection circuit, in those cases the involved channels will be switched off with FAULT LED indication.

6 Specifications

6.1 Technical features

AC Mains Supply……..…. : 110-230Vac ±10% 50/60Hz. (Auto ranging)
Consumption (during standby)….. : 1 W
Mains protection……..…. : 2 A retard fuse.
Output power per channel…….. : 50W (4 Ω) 1 kHz THD+N= 0,1%
Output power in BRIDGED mode.. : 100W (8 Ω) 1 kHz THD+N= 0,1%
Frequency response……..….. : 20Hz. To 20kHz 0dB/-3dB
Signal to noise ratio……..... : (A-Weighted) 100dB.
Harmonic distortion……..…….. : < 0,05%
Productivity…… : 90% (4 Ω)
Input impedance……..…. : 20kohms
Sensitive input range……..…..... : -22dBu / -5dBu
Protections…….…… - Overload
- Short circuit to ground
- Under-voltage and over-voltage
- DC
- Subsonic signals

Cooling……..……. : conventional
Classification……..…….. : IP 30 in the strength of liquid and powders permeation.
Dimensions……..……. : 141x109x41,5mm
Weight…… : 640g.

CEE directive compliant:

Safety……..…….. : 73/23 and following modification 93/68 art. 13
Electromagnetic compatibility… : 89/336 and following modification 93/68 Art. 5

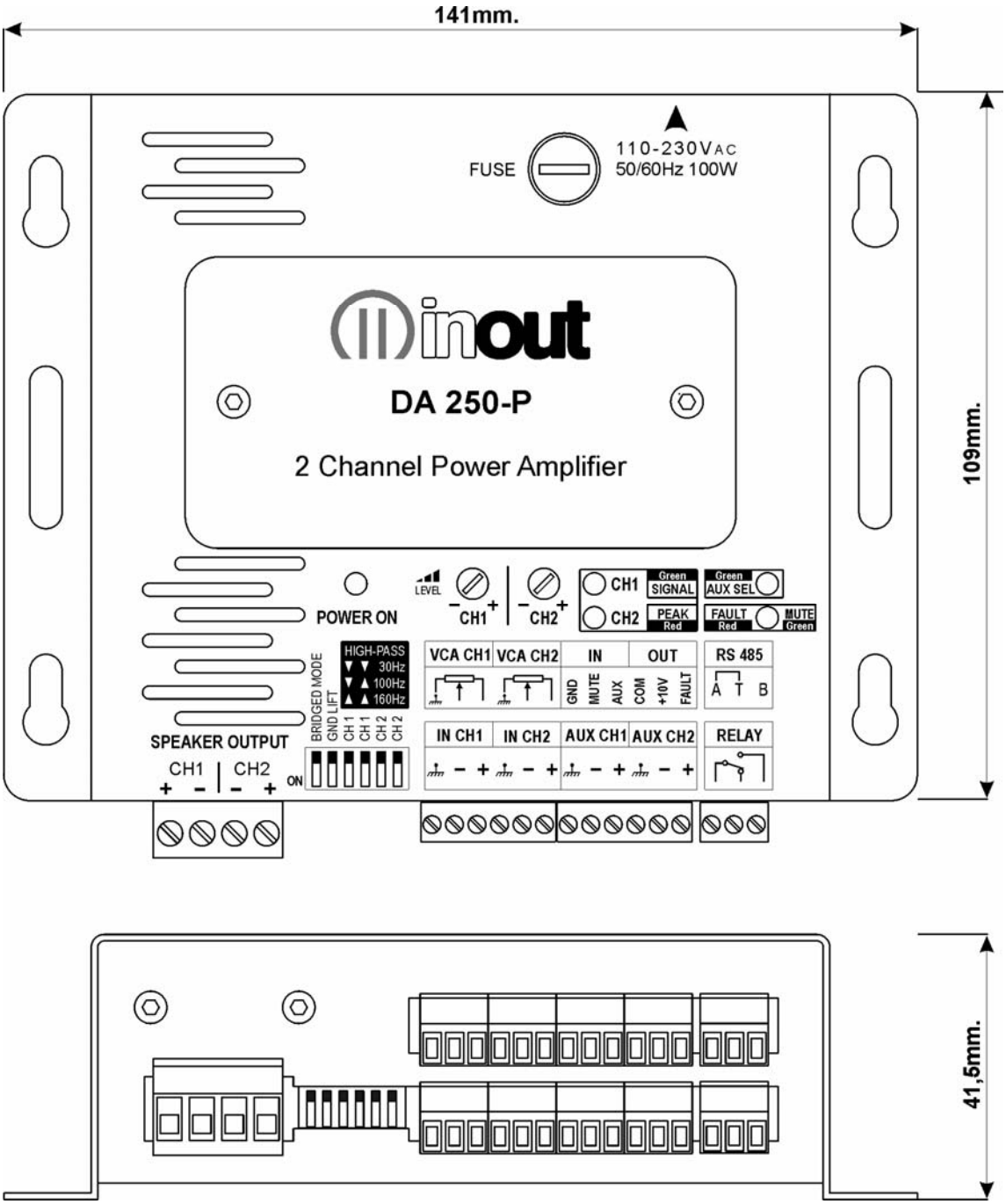
Applied standards:

Safety : EN 60065
Safety limitation for electronic devices and their accessories connected to the house power grid and analogous general use.

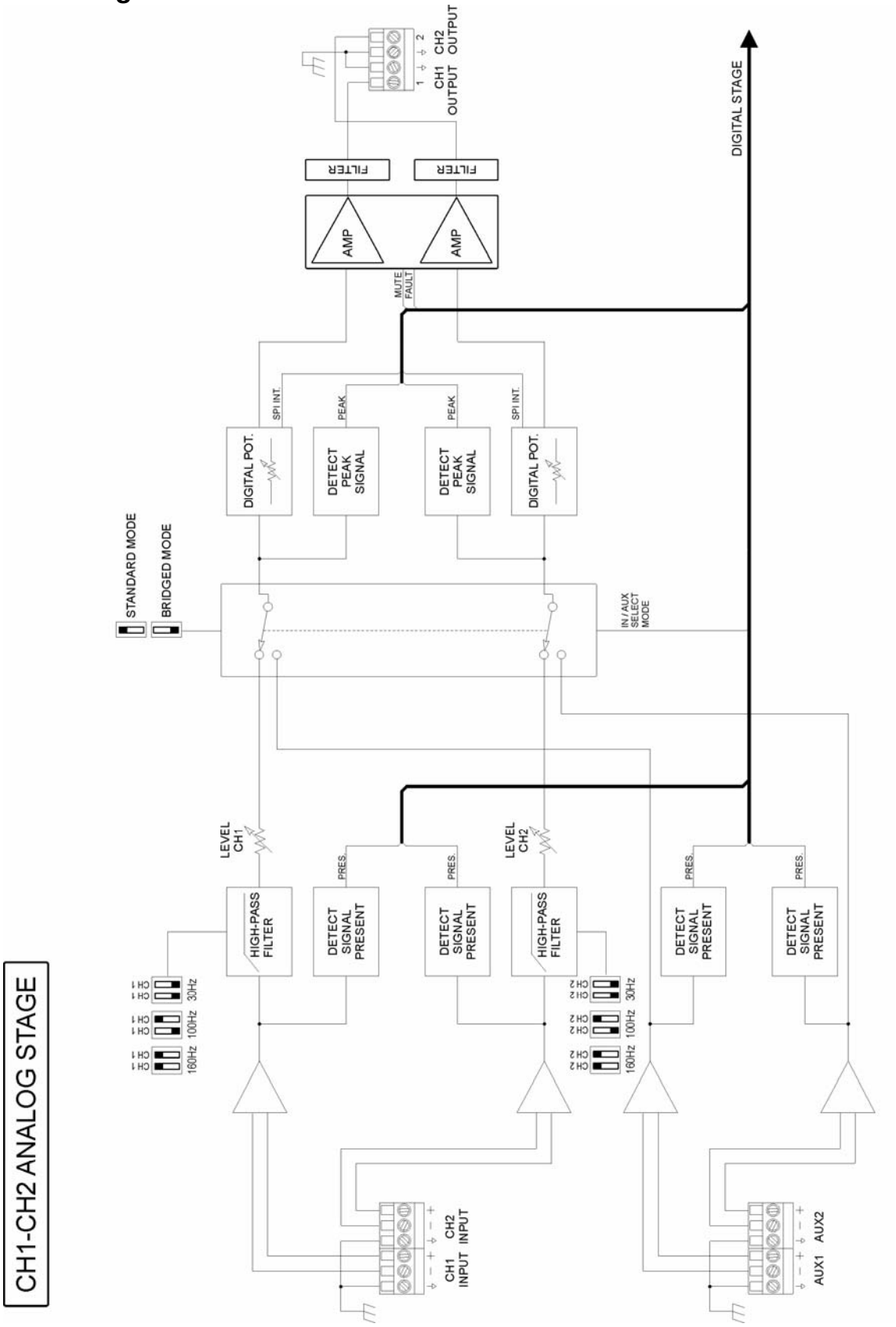
Electromagnetic compatibility for audio devices:
- Emissions
  - Harmonics : EN 61000-3-2
  - Voltage fluctuations : EN 61000-3-3
  - Radio interferences : EN 55013
- Immunity : EN 55020

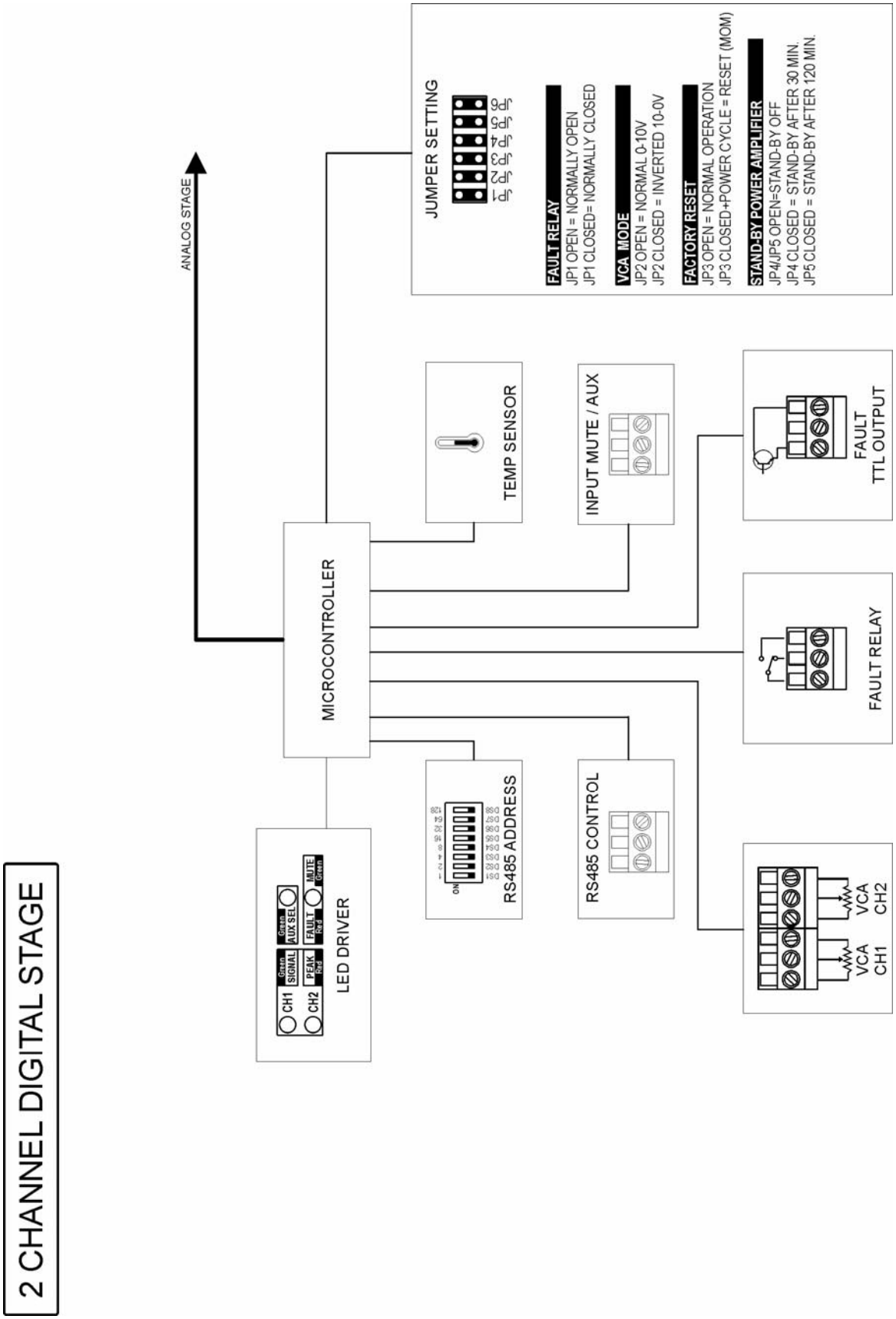
CE Manufactured by: inout Noventa di Piave (VE) - ITALY

6.2 Mechanical dimensions



6.3 Block diagram




2 CHANNEL DIGITAL STAGE
ANALOG STAGE
MICROCONTROLLER
LED DRIVER
CH1
SIGNAL
CH2
PEAK
AUX SEL
FAULT
MUTE
RS485 ADDRESS
RS485 CONTROL
TEMP SENSOR
INPUT MUTE / AUX
FAULT RELAY
FAULT TTL OUTPUT
VCA CH1
VCA CH2
JUMPER SETTING
JP1 JP2 JP3 JP4 JP5
FAULT RELAY
JP1 OPEN = NORMALLY OPEN
JP1 CLOSED= NORMALLY CLOSED
VCA MODE
JP2 OPEN = NORMAL 0-10V
JP2 CLOSED = INVERTED 10-0V
FACTORY RESET
JP3 OPEN = NORMAL OPERATION
JP3 CLOSED+POWER CYCLE = RESET (MOM)
STAND-BY POWER AMPLIFIER
JP4/JP5 OPEN=STAND-BY OFF
JP4 CLOSED = STAND-BY AFTER 30 MIN.
JP5 CLOSED = STAND-BY AFTER 120 MIN.